

## **SECTION 16140**

### **OVERHEAD CONTACT SYSTEM FITTINGS AND HARDWARE**

#### **PART 1 - GENERAL**

##### **1.1 DESCRIPTION OF WORK**

- A.** This Section specifies furnishing, delivery and installation of ferrous and non-ferrous metal material, hardware and fittings for a catenary system as shown on the Contract Drawings, including, but not limited to, the following:

1. Hangers
2. Wire splices
3. Clevis-clevis fittings
4. Wire terminations
5. Parallel wire clamps
6. Nuts, bolts, washers and cotter pins
7. Turnbuckles
8. Double clevis end fittings
9. Thimbles
10. Wire sleeves
11. Wire clips
12. Registration fittings and components
13. Feeder, suspension and supports

##### **1.2 REFERENCES**

- A.** Pertinent provisions of the MBTA reference drawings and Standards contained in the Appendixes and the following listed codes and standards shall apply to the work of this Section, except as modified herein, and are hereby made a part of this Specification to the extent required:

1. Ferrous Metals: American Society for Testing and Materials (ASTM)

A27 - Mild to Medium-Strength Carbon-Steel Castings

A36 - Structural Steel

- A47 - Malleable Iron Castings
- A153 - Zinc coating (Hot-Dip) on Iron and Steel Hardware
- A167 - Stainless and Heat-Resisting Steel
- Tubing
- A501 - Hot-Formed Welded and Seamless Carbon Steel Structural
- A518 - Corrosion-Resistant High Silicon Cast Iron
- A536 - Ductile Iron Castings
- A668 - Steel Forgings, Carbon and Alloy for General Industrial Use
- A711 - Carbon and Alloy Steel Blooms, Billets and Slabs for Forgings
- A747 - Steel Castings, Stainless, Precipitation Hardening
2. Non-Ferrous Metal: American Society for Testing and Materials (ASTM)
- Bar and Shapes
- B26 - Specification for Aluminum-Alloy Sand Castings
- B140 - Copper-Zinc-Lead (Leaded Rod Brass or Hardware Bronze) Rod,
- B148 - Aluminum-Bronze Sand Castings
- B179 - Aluminum Alloys in Ingot Form for Sand Castings, Permanent Mold Castings and Die Castings
- B248 General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strips and Rolled Bar
- Rod, Bar and Shapes
- B249 - General Requirements for Wrought Copper and Copper-Alloy
- B315 - Specification for Seamless Copper Alloy Pipe and Tube
- B557 - Methods of Tension Testing Wrought and Cast Iron Aluminum - and Magnesium - Alloy
- B584 - Copper Alloy Sand Castings for General Applications
- B686 - Specification for Aluminum Alloy Castings - High Strength
- One copy of each of the standards for Non-Ferrous Metals shall be furnished to the Authority for their use and permanent records.

### **1.3 SUBMITTALS**

**A.** The following information shall be submitted in accordance with Section 01300:

1. Shop Drawings: The Contractor shall submit Shop Drawings for all components for approval prior to manufacture, showing details and dimensions, and giving designations of the materials comprising the various components together with technical, mechanical and electrical characteristics as appropriate.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- A.** The identification mark of the manufacturer or foundry and the pattern numbers assigned by the supplier shall be cast into all castings. Marks and numbers shall be readable size, and placed in such a position that they will not affect the electrical or mechanical performance.
- B.** Fittings and hardware shall be packed adequately to ensure acceptance and safe delivery, in accordance with the best commercial practice.
- C.** Overhead fittings and hardware shall be adequately packaged to allow stacking and outdoor storage until installation, with no harmful effects until installation.
- D.** Each part shall be tagged with description, purchase order and line item numbers, as well as assembly and item number (e.g., PS-01 Item 4).

#### **1.5 QUALITY CONTROL**

The Contractor shall submit certification to the Engineer verifying that all hardware items are in conformance with ASTM Standards referenced herein.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A.** Material for hardware and fittings shall comply with the MBTA Standard Specification for Overhead Components, included as Appendix A to this Section, and applicable referenced standards. Substitutions may be submitted to the Engineer for consideration. The Contractor shall be responsible for form and fit of all components and hardware, as shown on the Contract Drawings and should consider maximum interchangeability of components to reduce inventory.

#### **2.2 METAL CHARACTERISTICS**

- A.** Malleable Iron: Fittings or components made of malleable iron shall be Grade 32510 or better and shall conform to ASTM-A47. All components and fittings shall be galvanized in accordance with ASTM-A153.
- B.** Forged Steel: Material for forged steel shall comply with ASTM-A711 or

A668. All components and fittings shall be galvanized in accordance with ASTM-A153.

- C.** Structural Steel Tubing: Structural steel tubing shall conform to ASTM-A501 and galvanized in accordance with ASTM-A153.
- D.** Ductile Iron: Fittings or components requiring high yield strength shall be of ductile iron, Grade 60.40.18 or better and shall conform to ASTM-A536. All fittings shall be galvanized in accordance with ASTM-A153.
- E.** Stainless Steel: Stainless Steel hardware shall conform to ASTM-A747. Cotter pins shall be made of stainless steel.
- F.** Non-Ferrous Metals: Copper alloys for fittings and components shall conform to ASTM-B584 and B148.
- G.** Copper: All copper components shall conform to ASTM-B248 or B249.

## **2.3 FABRICATION**

Castings shall be of uniform quality and shall be made in such a manner that the material of the casting conforms to the chemical and mechanical properties prescribed in the referenced ASTM standards.

## **2.4 TECHNICAL SUPPORT EQUIPMENT**

- A.** General: The Contractor shall provide an adequate supply of parts, equipment, materials and required tools available at the site for orderly installation and testing of equipment without delay.
- B.** Requirements for Installation: An additional quantity of five percent or two of each item of fittings and hardware, whichever is greater, shall be provided at no additional cost to the Authority and shall be made available for use during the installation. These items shall be turned over to the Authority uninstalled.
- C.** Special Tools: If any special tools are required for installation, the Contractor shall furnish two sets of each, to be turned over to the Authority upon Contract completion.

# **PART 3 - EXECUTION**

## **3.1 INSTALLATION**

Overhead fittings and hardware will be installed as part of one or more assemblies shown on the Contract Drawings in accordance with Section 16123 - OVERHEAD CONTACT SYSTEM INSTALLATION.

## **PART 4 - MEASUREMENT AND PAYMENT**

### **4.1 GENERAL**

No separate measurement or payment will be made for work under this Section. All costs in connection therewith shall be considered incidental to the items of work for which they pertain.

**END OF SECTION**